PHYSICAL EXERCISES FOR ASTHMA

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ASTHMA RESEARCH COUNCIL

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THE ASTHMA RESEARCH COUNCIL was formed in October 1927, to promote research into asthma and its allied disorders.

The Council, which is under the patronage of H.R.H. The Duke of Gloucester, is responsible for raising the necessary funds for research and is assisted by an Honorary Medical Advisory Committee. Sir Albert Stern, K.B.E., C.M.G., is Honorary Treasurer.

Funds have been used for grants to qualified investigators, working in asthma clinics and laboratories attached to London Hospitals, including Guy's Hospital, St. Mary's Hospital, St. Thomas's Hospital and King's College Hospital. These institutions have generously provided free accommodation and facilities for research. Grants have also been made to help research in provincial centres.

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PHYSICAL EXERCISES FOR ASTHMA

In an asthmatic attack the diameter of the small bronchi (air-tubes) is diminished as a result of spasm of the muscular coat. In inspiration (breathing in) the small bronchi are pulled open and the obstruction is thereby reduced. On the other hand, forced expiration (breathing out) tends to compress the bronchi and increase the obstruction. Consequently inspiration is much easier than expiration : the difficult breathing of asthma differs in fact from all other forms of difficult breathing in being mainly expiratory in character.

As inspiration remains comparatively easy during an attack, the lungs become more and more distended with air which the forced expiration is incapable of expelling. Consequently at the height of an attack the lungs are distended to their maximum capacity and each expiratory effort, however violent, results only in the expulsion of a very small quantity of air.

At the end of an attack the surplus air is expelled from the over-expanded lungs, which return to their normal size. If, however, the attacks are of long duration and frequent, the lungs remain over-distended, especially if, as is usual in chronic cases, the patient continues to be slightly out of breath for most of the day as well as during the attacks.

The shape of the chest adapts itself to the condition of the lungs : when the latter are over-distended, the chest assumes the so-called " barrel-shape ", with the shoulders shrugged, the spine curved and the angle where the ribs join the breast bone unduly wide. If this position is maintained for long periods, the muscles of the chest gradually become so accustomed to it that even if the patient is subsequently completely free from asthma, the chest wall does not return to its normal position of rest. This can still be restored by means of a voluntary effort if the condition has not lasted for too long a period. When as a result of chronic asthma the chest has assumed a greater size than normal, the lungs must also remain over-distended.

The distended lungs are generally called emphysematous ; but true emphysema depends upon degeneration of the elastic tissue of the lungs, which can no longer collapse (organic emphysema). These changes do not occur in uncomplicated asthma ; the lungs are large because they are

distended and not because they are emphysematous (temporary or functional emphysema).

In true emphysema the enlargement of the lungs is primary and organic in origin and that of the chest is secondary. The enlargement of the lungs during an asthmatic period is primary but functional in origin, and the enlargement of the chest is secondary. But when the attack has disappeared and the patient becomes free from asthma, perhaps for months, perhaps for the rest of his life, the enlargement of the lungs is secondary to that of the chest wall, which has become fixed in an expanded position.

The first object in treating a chronic asthmatic patient by exercises is to restore the lungs and chest cavity to their normal size ; in an early case, in which the muscles of the chest have not yet assumed a new length which keeps the lungs over-distended, the object of treatment is to prevent this from occurring. Ordinary breathing exercises, the object of which is to increase the expansion of the chest, are therefore of no use, as the patient is already capable of expanding his chest to its greatest possible distension.

If an asthmatic is told to breathe deeply, his respiration is seen to be almost entirely carried out with the upper part of the chest. In chronic cases, the lower part is generally already fully expanded and remains almost immobile, and the diaphragm is used only to a very slight extent. The exercises are designed to teach the patient, first, to use the lower part of his chest as well as the upper part, and, secondly, to employ diaphragmatic breathing to a greater extent than he has been accustomed to do.

The exercises can be performed reclining on a bed, sitting on a stool or standing, according to the state of the patient's health at the time ; in any case the body should be relaxed with the arms by the sides. The patient should face a mirror, if possible, so that he can watch the effect of the exercises on the shape of his chest.

The exercises should at first be carried out with the aid of a physiotherapist (masseuse), who is an expert in breathing exercises. The patient should, however, continue to practise some of them daily for the rest of his life, even if he remains completely free from asthma for periods of months or years. It is indeed during periods of complete freedom, when plenty of open-air exercise can also be taken, that the exercises are most likely to give rise to a permanent improvement in the shape of the chest.

The exercises should be performed as far as possible in front of an open window at the following times :

(1) in the morning, before breakfast, when the patient is feeling fresh and is least likely to be asthmatic ;

(2) at night, before getting into bed, to clear the lungs before sleep ;

(3) at the first sign of an impending attack, in order to prevent the asthma coming on ; many patients are able to abort their attacks entirely by doing the simple exercises gently.

Should the patient be in a condition of slight, but continuous, shortness of breath, it is advisable to take a dose of whatever remedy he finds suits him best before beginning the exercises, e.g. an ephedrine or caffeine citrate tablet, the use of an atomizer, or a small injection of adrenaline.

When properly performed, the exercises may cause "wheezing" and coughing at the end of expiration. This may distress the patient and at the beginning of treatment it is a common complaint that the exercises make him feel worse. With perseverance, however, the mucus in the bronchial tubes becomes loosened and the patient is able to cough it up, with consequent relief of the attack. Learning to acquire natural diaphragmatic breathing is like learning to ride a bicycle—difficult and uncomfortable at first until the knack is acquired, when it becomes second nature.

Having learnt the proper way to breathe, many patients can prevent an attack progressing by doing the exercises. They feel they have a method of relief in their own hands and lose their fear of attacks, thus acquiring confidence—a most important matter for every asthmatic.

It is essential that the patient should be shown how to do the exercises correctly by a physio-therapist specially trained in them, and every case requires individual attention until the exercises are mastered correctly.

ESSENTIAL POINTS IN THE PERFORMANCE OF THE EXERCISES

1. Before beginning the exercises, the patient should blow the nose on a handkerchief to ensure a clear air-way.

2. As the object of the exercises is to empty the lungs, each exercise should begin with a quiet breathe-in through the nose, taking a small breath only, followed by a *long* breathe-out through the mouth, making an F or S sound with the lips and teeth. This noise fixes the patient's attention on blowing out as long as possible and enables the physio-therapist to hear that the patient is doing this. Children can be taught to blow bits of cotton-wool, ping-pong balls, etc., when breathing out through the mouth in a way they cannot do when breathing out through the nose.

3. When breathing *in*, the patient must learn keep to the upper part of the chest still, so that the breathing is performed mainly by the diaphragm. When breathing *out*, the abdominal wall should contract, sinking in towards the spine. The next breath is drawn into the lungs automatically by simply allowing the abdominal wall to relax and the lower part of the chest to expand slightly. All exercises should finish by breathing out with the abdomen contracted.

4. Unless the chest is absolutely clear the patient should breathe out sufficiently to hear the wheezing noises in the base of the lungs. This may cause coughing and increased wheezing, but should be gently persevered with. The patient should rest for a minute or two between each exercise.

5. To begin with, the exercises should be done very gently with plenty of rest. When the patient is "tight in the chest" he should do them in the reclining position, lying back on the pillows with the knees comfortably drawn up. He may also lie on his side with his knees bent comfortably.

6. The elementary exercises should be practised until they are done perfectly before going on to the advanced exercises. When an attack of asthma is starting, the second exercise, 1B, is generally found most useful.

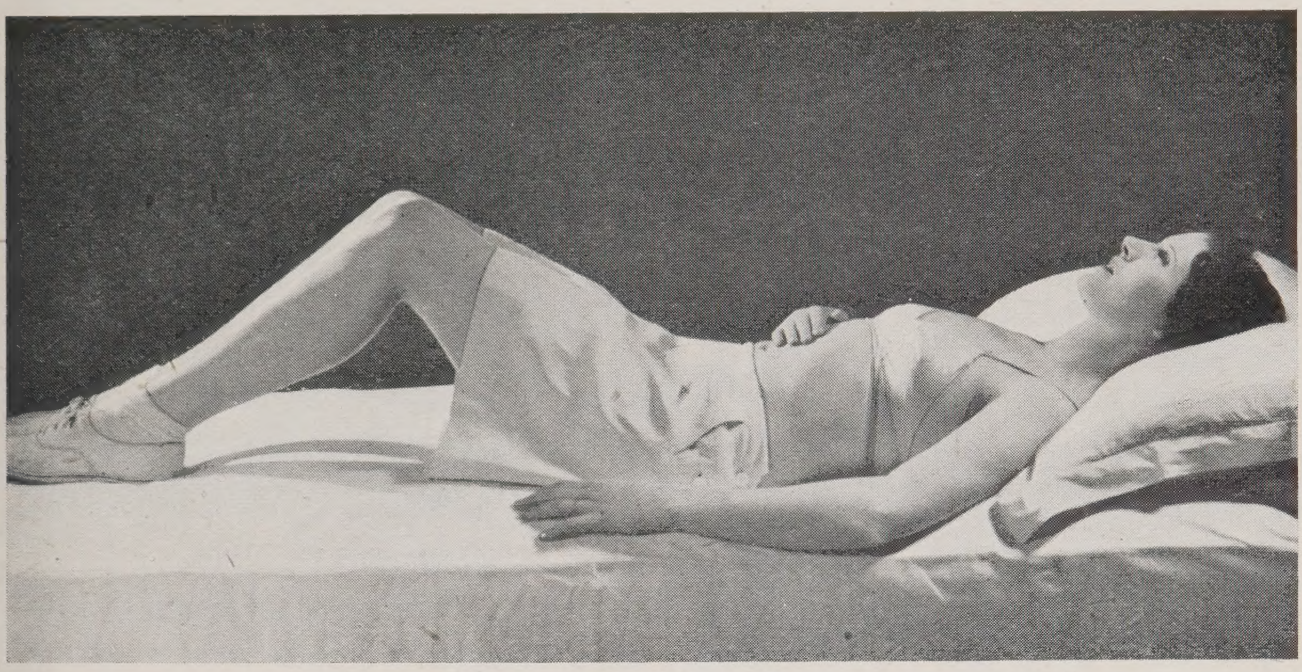
Exercises 1A and B, 2 and 3 are all that should be attempted for the first fortnight or longer. Older patients should not attempt the advanced exercises, except possibly the sitting side-bending exercise No. 7, nor the energetic part of exercise No. 6 (double knee-raising) unless under the supervision of a physio-therapist (masseuse).

7. It is a good thing to time with a watch how long the patient can keep up the blowing out, but on no account must he take in a deep breath first. To begin with a few seconds is all a patient can do, but later on he may be able to sustain the "hiss" for 10 to 20 seconds.

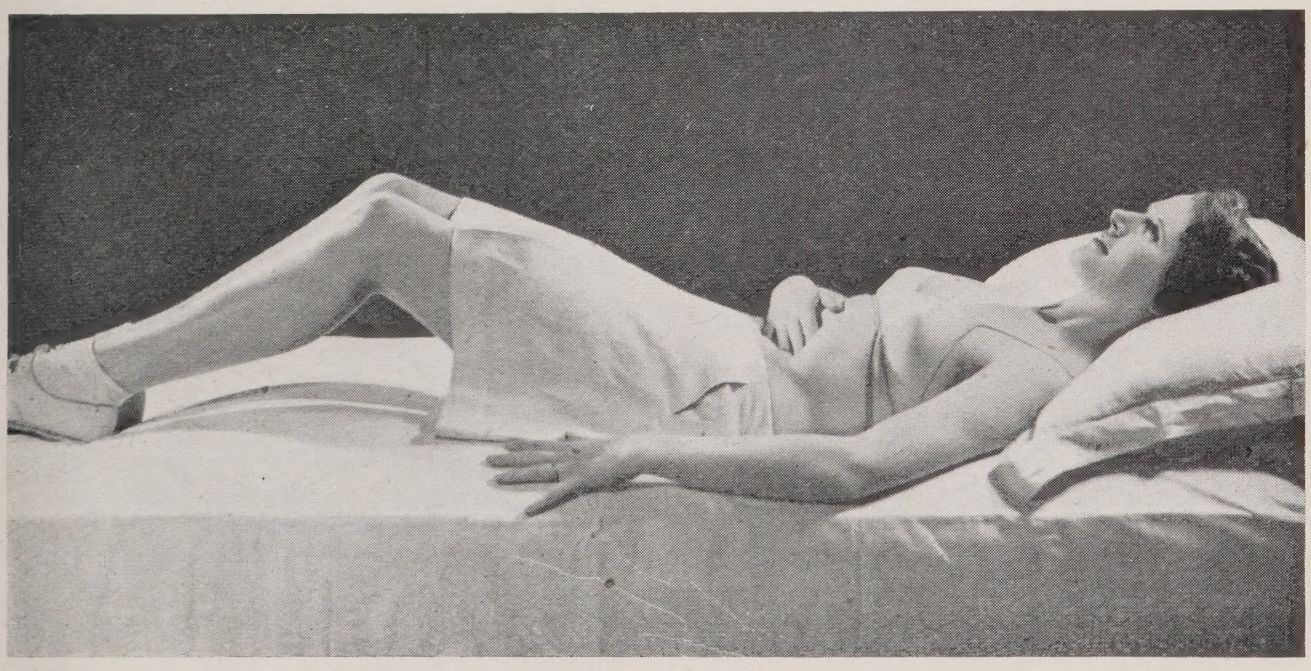
8. The exercises should be practised for ten minutes three times a day, increasing later to twenty minutes, and a habit of diaphragmatic breathing should be cultivated by practising it at odd moments during the day. Once the exercises have been properly mastered, commonly in two or three months, the time may be reduced to five minutes morning and evening as a regular habit for at least twelve months.

Part I ELEMENTARY EXERCISES

IA. DIAPHRAGMATIC BREATHING

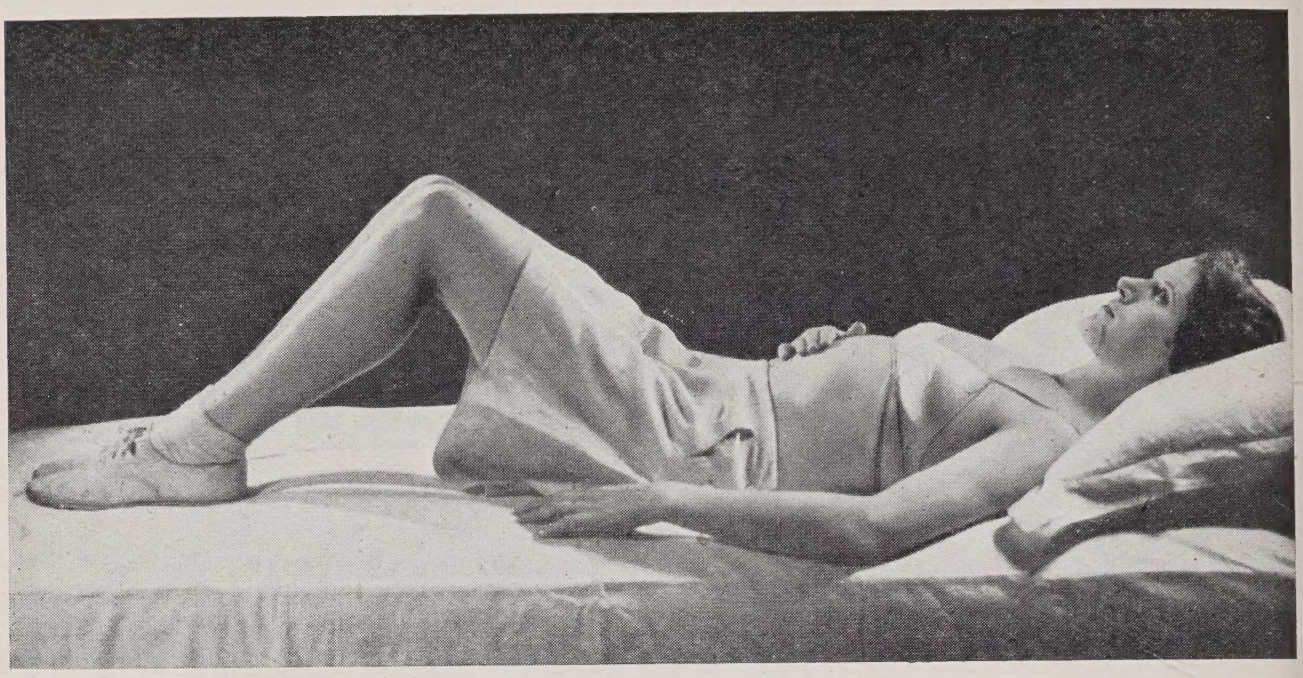


STARTING POSITION. Either lying back with the knees drawn up or sitting with the back resting against a chair. There must be complete relaxation.



Breathe out slowly whilst gently sinking the chest as much as possible, and then the upper abdomen. At the end of breathing out the abdomen should be well drawn in, the fingers resting either lightly on the upper part (as in the photograph), or both hands should rest on the lower front margins of the ribs.

1A. DIAPHRAGMATIC BREATHING (continued)



Relax the upper abdomen so that it swells a little and the lower part of the chest is felt to expand slightly, whilst air is breathed in quickly but silently through the nose. The chest is not raised. Repeat the exercise eight to sixteen times, then rest for a minute and repeat again.

Note.—It is important during the breathing-in part of the exercise that the abdomen is relaxed and that the air is felt to be sucked in, as it were, by this action and not drawn in by any effort of the patient.

If it is necessary to take a gasping breath which swells the chest immediately after breathing out, it is a sign that the breathing out was kept up too long. Breathe out just sufficiently quickly to be able to follow it by a quiet *intake of air without raising the chest. After the regular practice of this exercise it will be found that the breathing out becomes longer. Starting perhaps at five seconds only, it will become possible to keep it up for ten to fifteen seconds regularly.*

1B. 'ABBREVIATED' DIAPHRAGMATIC BREATHING

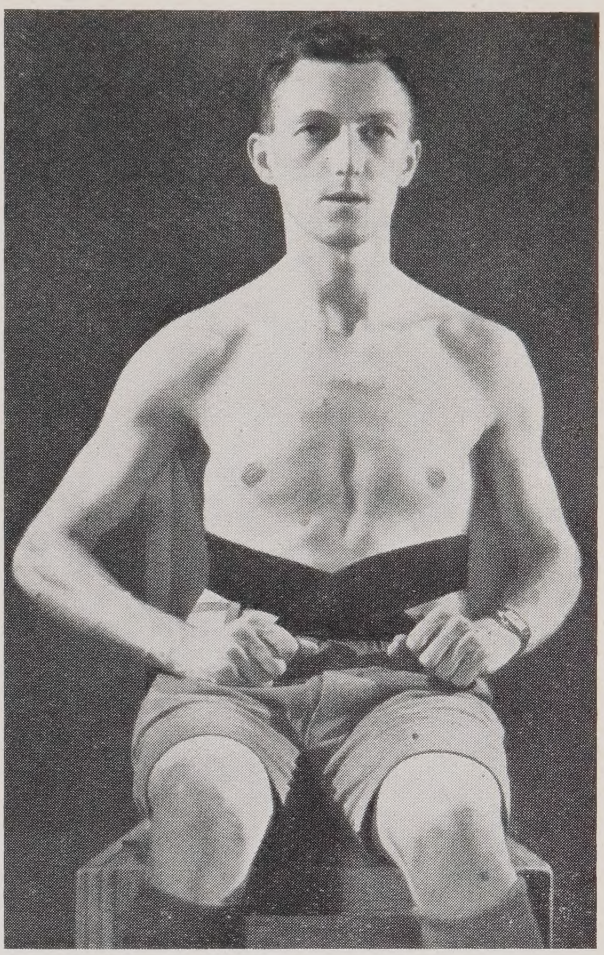
POSITION. Lying or sitting with back resting.

Relax the chest and rather sharply draw in the abdomen whilst breathing out, then breathe in by relaxing abdominal muscles quickly, following this immediately by contracting abdominal muscles while sharply breathing out. Once started, this exercise consists of sharp, quick breathing out with an equal length pause for quiet breathing in. The breathing is quicker than normal breathing.

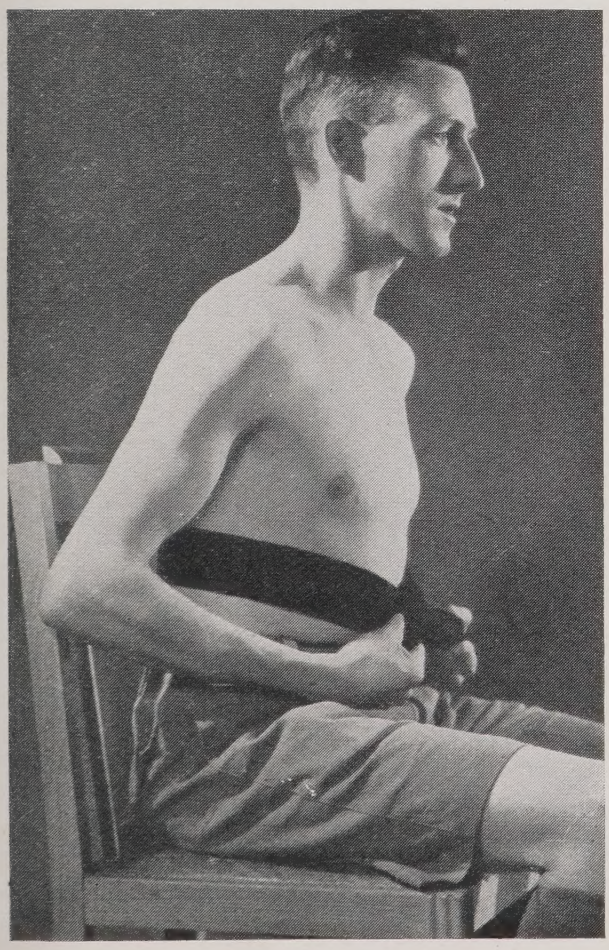
This exercise should be practised when the patient is too short of breath to be able to maintain the slow breathing out of Exercise A. It needs to be learnt, however, when the patient is as free as possible from asthma, to be effective in reducing shortness of breath.

2. SIDE-EXPANSION BREATHING WITH A BELT FOR PRESSURE

The side-expansion exercise on page 26 (shown by child) should be learnt before this belt exercise in order to gain control over the upper chest.



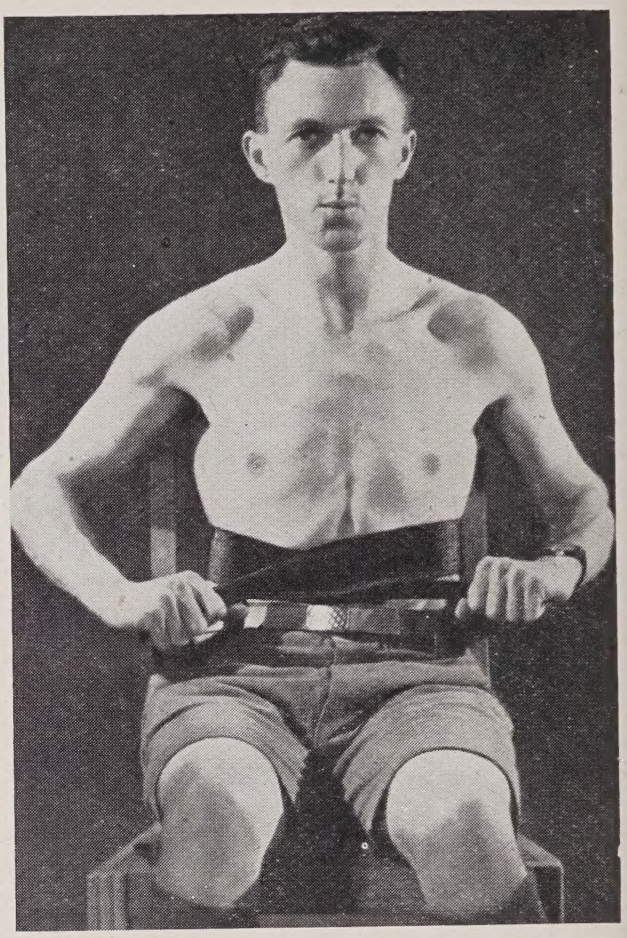
STARTING POSITION.
Either lying back with the knees drawn up or sitting with the back resting against a chair. There must be complete relaxation. Place belt round lower ribs, above waist.

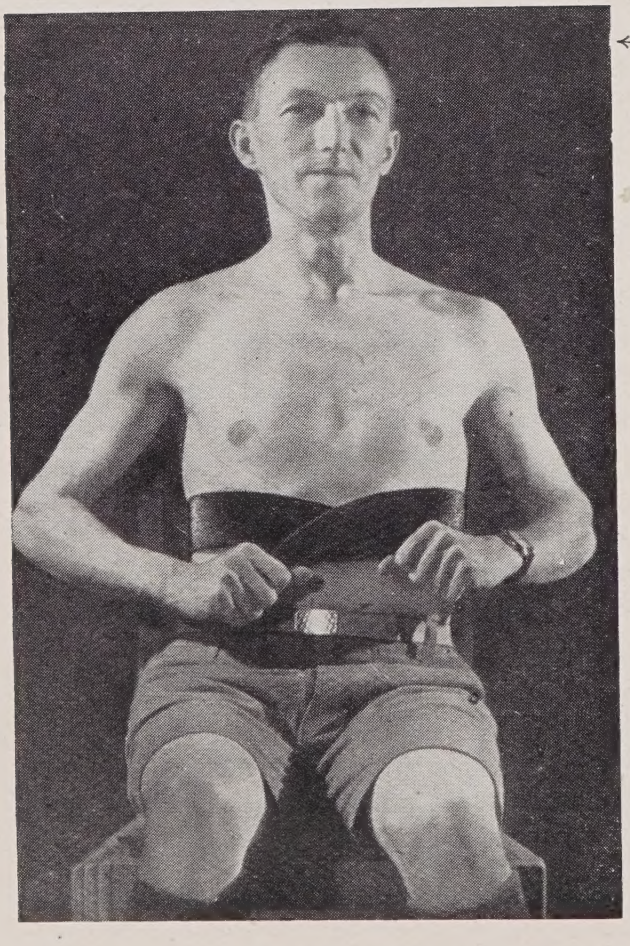


(i) Breathe out slowly, sinking first the upper chest, then lower ribs

2. SIDE-EXPANSION BREATHING (continued)
WITH A BELT FOR PRESSURE

and finally, squeeze the ribs a little by tightening the belt to empty the lungs as completely as possible.





←(ii) Expand the lower ribs against the belt (making the *ribs* expand the belt) while quietly breathing in.

Then relax the shoulders and arms completely while repeating the breathing out until needed for the squeeze at the end.

In the first and second photographs it will be seen that the hands and wrists rest against the patient's body during the early part of the breathing out, thus assuring relaxation of the arm and shoulder muscles. In the fourth photograph though the lower ribs are expanded the upper chest is not raised. Some patients may find it easier to continue doing this exercise with hands on lower ribs (as shown in Children's exercise on page 26) instead of using a belt. *See next page.*

Exercises Nos. 1 and 2 are the most important ones to practise and to keep up regularly for about three to five minutes each. The breathing out should last ten to fifteen seconds. Exercise No. 2 should not be practised until the patient has learnt to control the chest and abdomen to a certain extent by doing Exercise No. 1A.

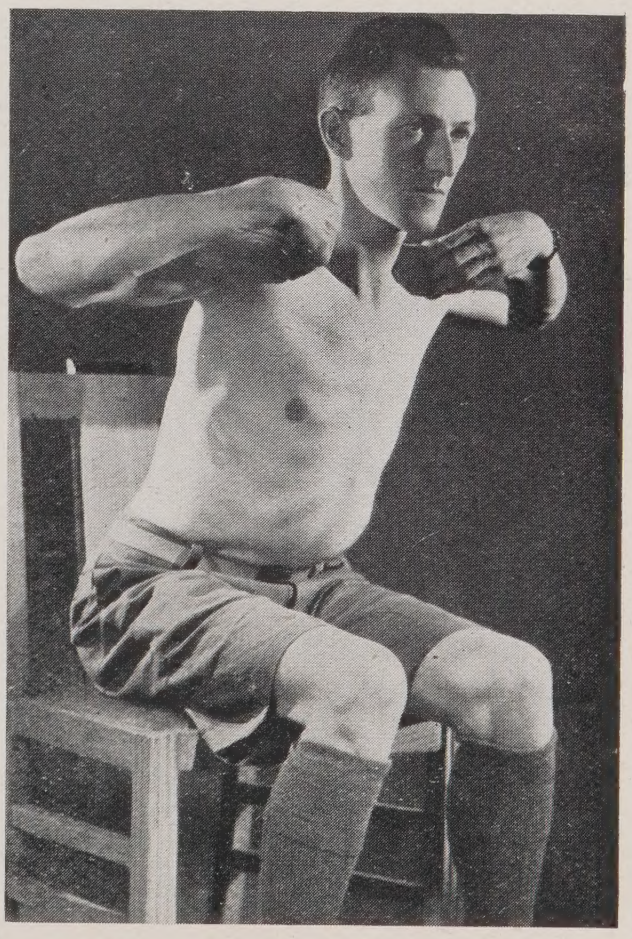
The other breathing exercises are mainly to train fuller diaphragmatic and side breathing, and provide a change now and then in the treatment. The forward-bending helps also to get good posture of the spine, the knee-raising exercise to strengthen the abdominal muscles, the side-bending to loosen the lower ribs—the particular exercises most suitable to the patient can be chosen. No patient needs a scheme of more than five (or possibly six) exercises. If not more than ten minutes can be spared regularly morning and evening it is far better to keep to three or four. Nos. 1A and 2 should always be done, the other one or two can be different morning and evening. Some of the exercises are progressions on others, for instance, No. 9 replaces No. 4, No. 8 has a similar though stronger effect than, and can replace No. 3 for a change.

3. ELBOW CIRCLING

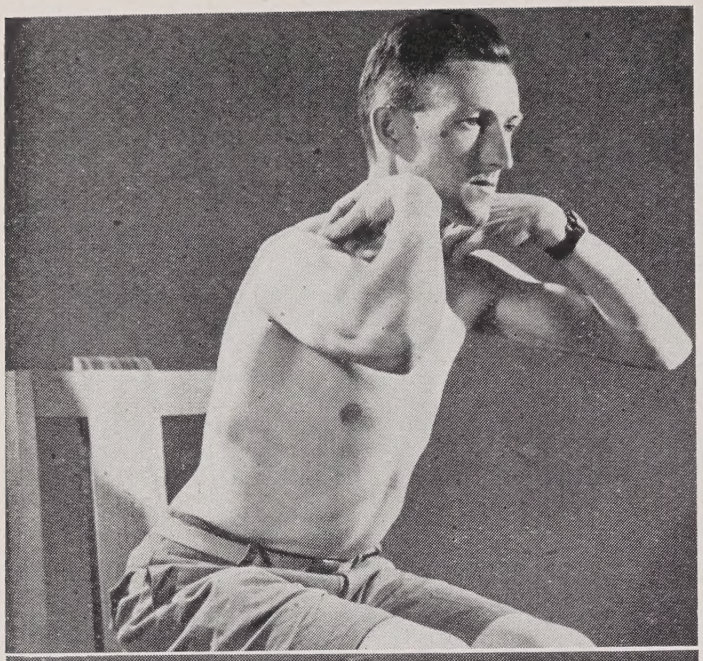
A LOOSENING EXERCISE FOR SHOULDERS

To be done between breathing exercises.

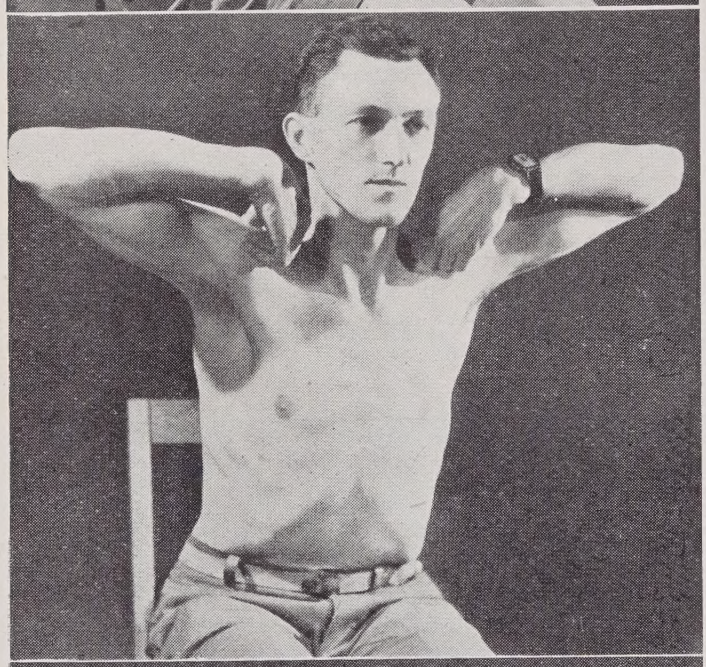
STARTING POSITION. Sitting, leaning forwards with the back flat and fingers to shoulders, which should be kept well down, elbows in a straight line with shoulders. Carry the elbows in circles.



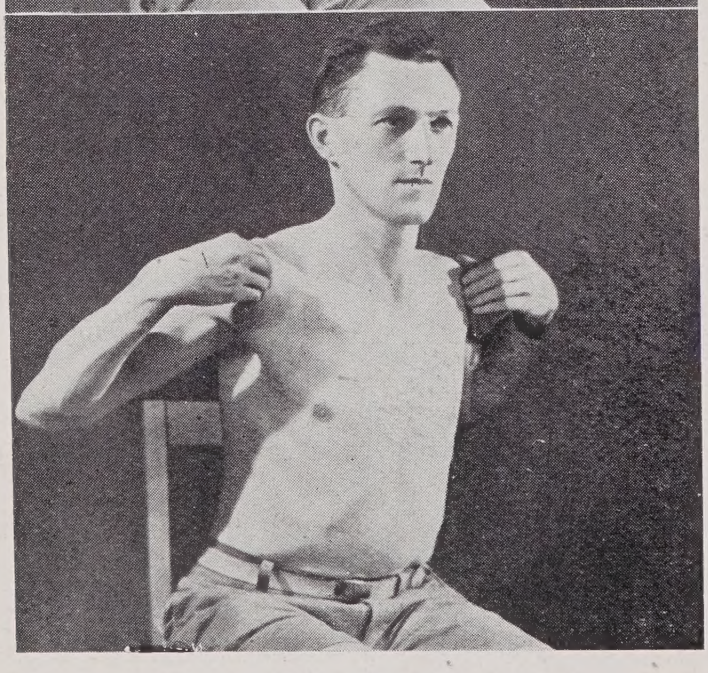
Note.—The back is held in the same forward leaning position (the second photo shows line of back) throughout the movements. This is to ensure that the movement takes place in the shoulder-girdle joints and not in the back.



slightly forwards,



up,



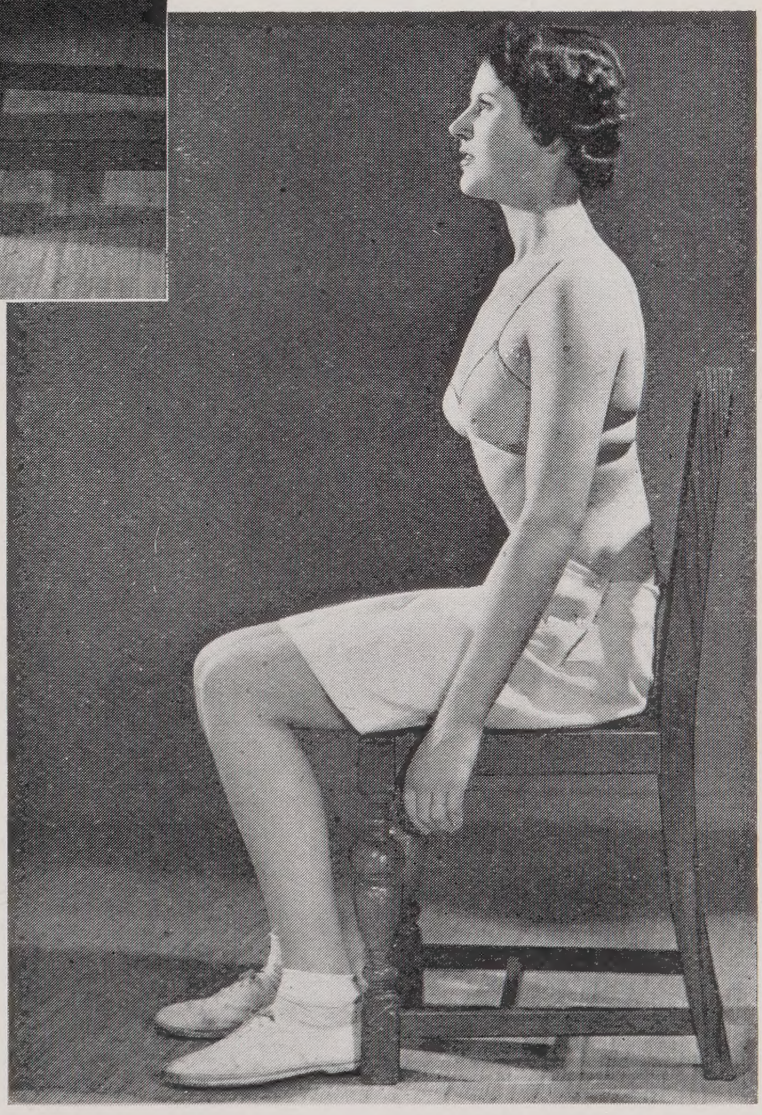
back, and downwards.

Do four to eight circles; rest, and then repeat several times. On resting, drop the hands to the sides and rest back against chair.

4. FORWARD BENDING

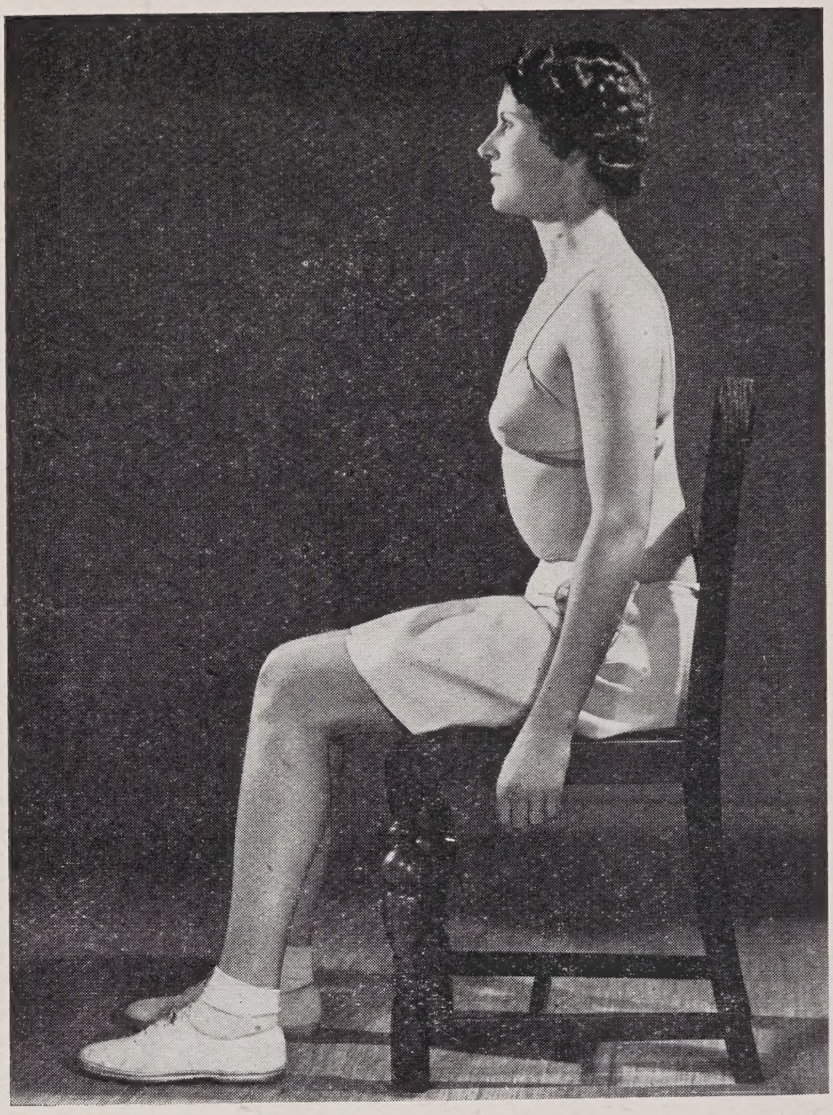
STARTING POSITION. Sitting with the feet apart, arms relaxed at sides.

(i) Breathe out slowly while dropping the head, sinking the chest, and then bending forwards until the head is over or between the knees. The abdominal muscles are firmly drawn in during the last part of the bending forwards.



(ii) To raise the body, gradually push out the back so that the lowest part reaches the back of the chair first, followed by the middle then upper part, shoulders, neck, and finally head. To press back the lowest part of the spine, the abdominal muscles must be well drawn in and a pause made in breathing meanwhile.

Breathe in for the rest of the back straightening by relaxing the abdominal muscles and gently expanding the lower front ribs.



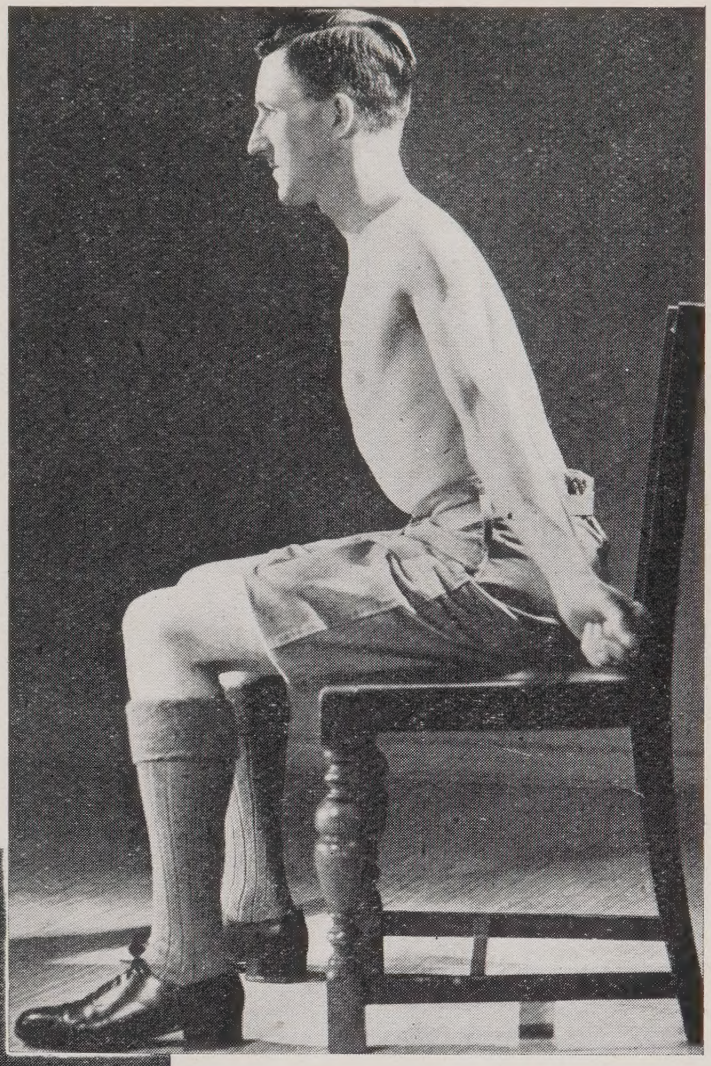
(iii) Breathe out quickly, sinking the chest and abdomen but keeping the erect position of back and head.

(iv) Breathe in a small breath, expanding just above the waist as in (ii), and repeat (i).

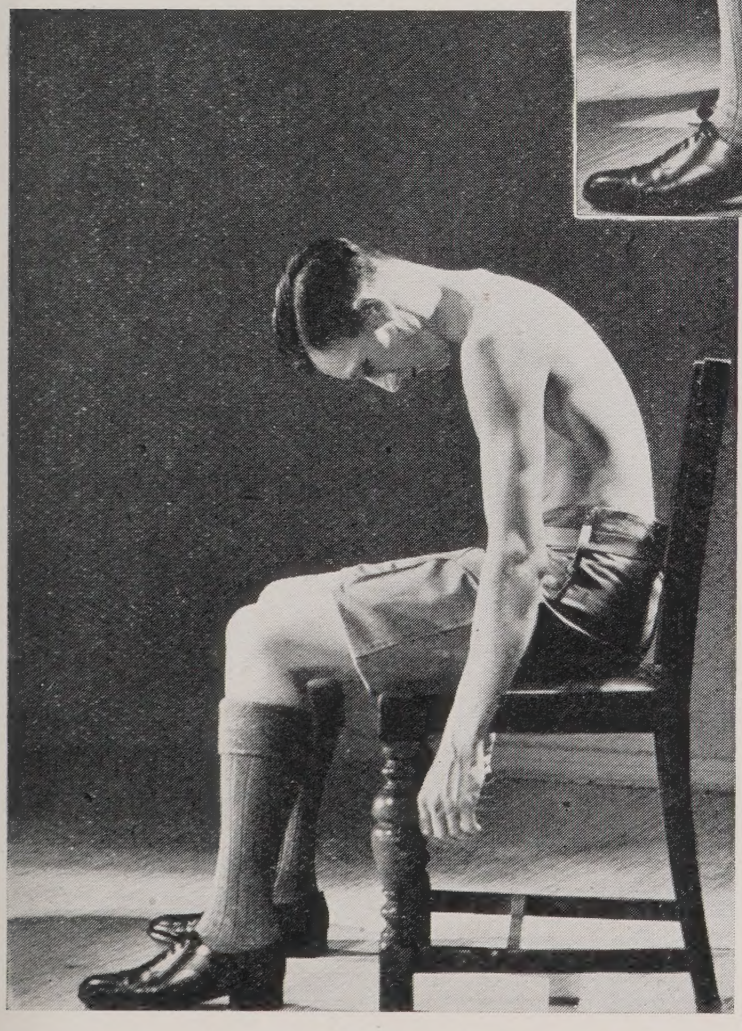
Note.—(i) is carried out as slowly as possible, (ii) more quickly.
In addition, to help gain full expiration, this exercise also loosens the back and helps to gain good posture if the back is carefully " curled up " and " uncurled ".

5. RELAXING EXERCISE

POSITION. Sitting. At first (i) shrug the shoulders slightly and tighten all the muscles, (ii) then let arms hang heavily. Later, as in first photograph,



(i) lean forwards and press back the head, neck, shoulders and arms,



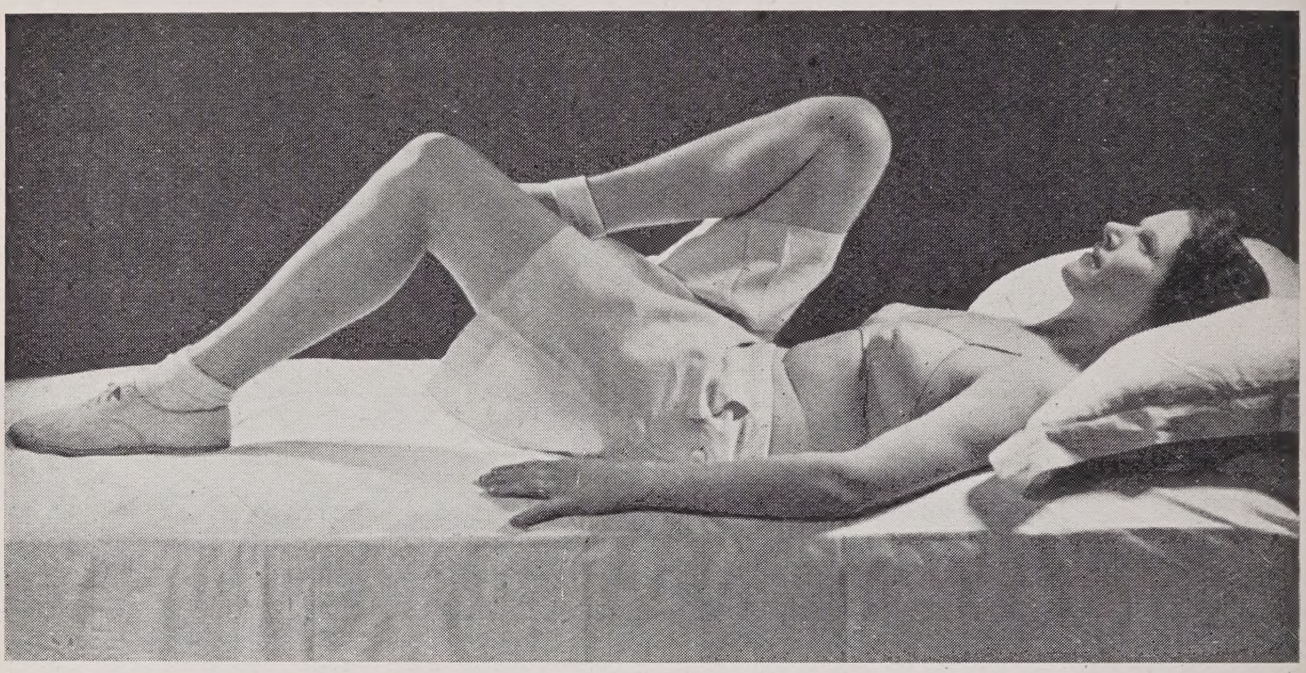
(ii) relax, dropping head and arms and allowing back to round.

Note.—The tightening and pressing back should be done quickly (count two). The relaxing should be maintained for twice as long (count 4).

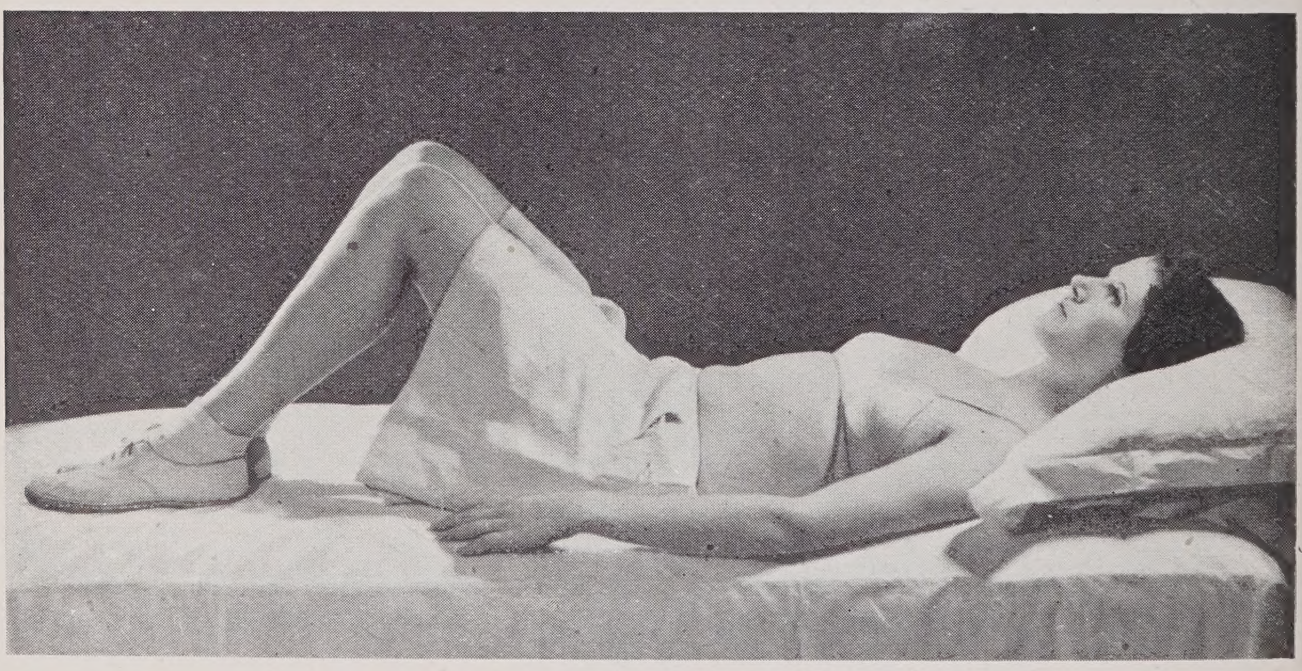
Part II ADVANCED EXERCISES

6. ABDOMINAL MUSCLE EXERCISE

STARTING POSITION. Lying with knees drawn up.

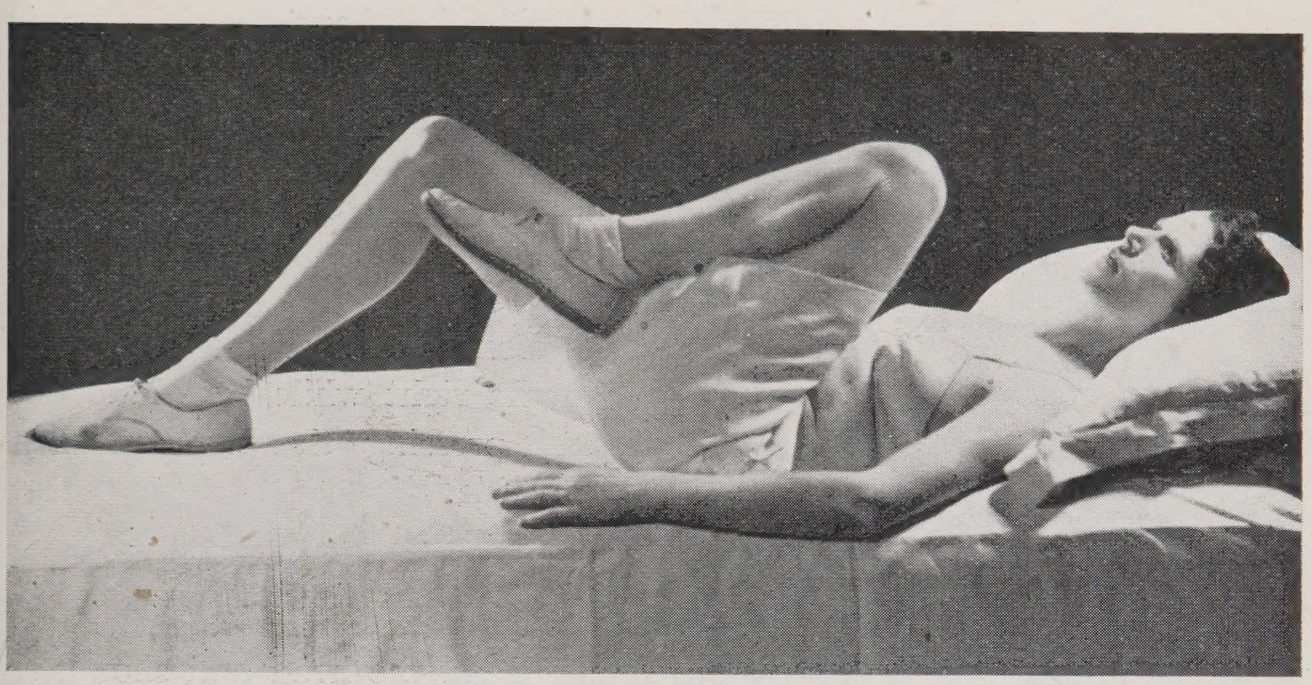


(i) Draw the right knee slowly up towards the chin while breathing out. Pause in the breathing while lowering the right knee quickly, and then

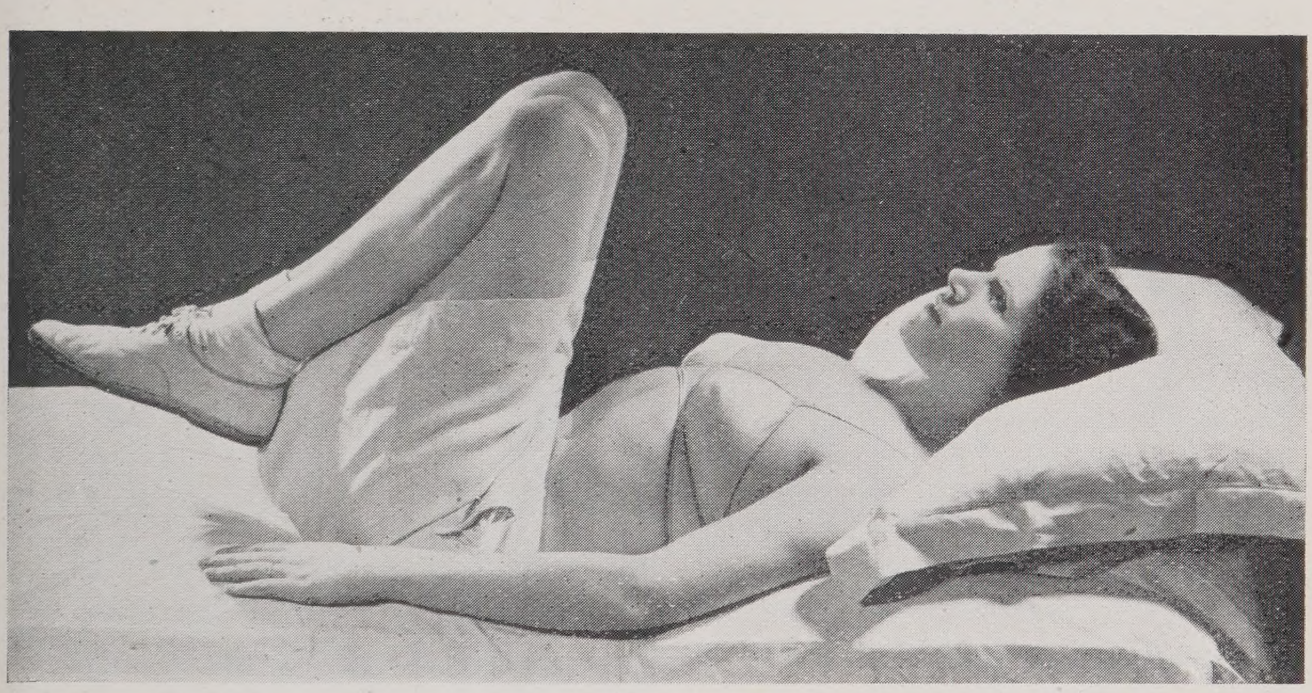


(ii) Breathe in, relaxing abdominal muscles and gently expanding lower front ribs only.

6. ABDOMINAL MUSCLE EXERCISE
(continued)



(iii) Repeat the exercise with the left knee.



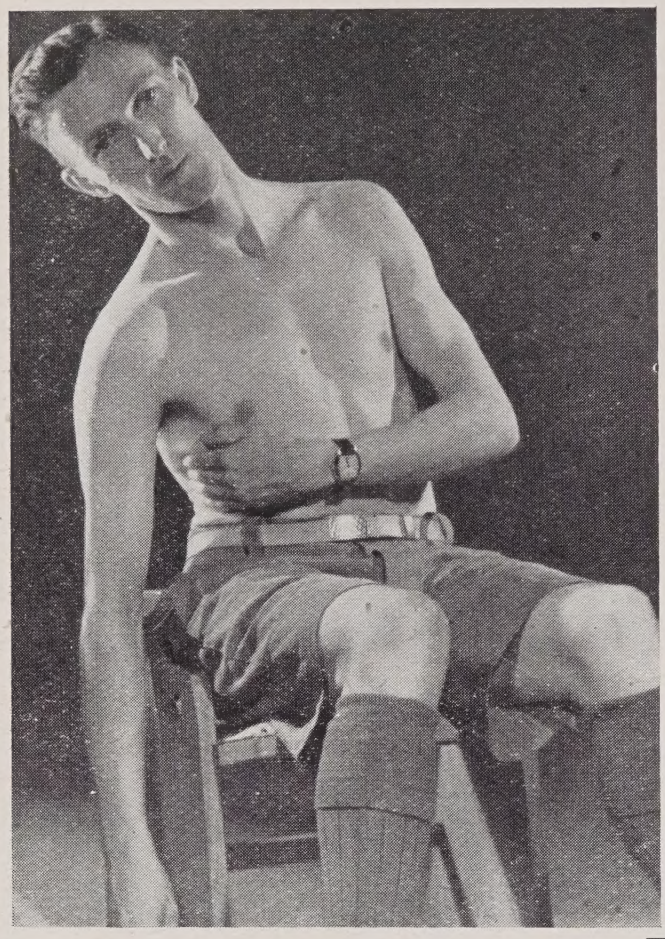
(iv) Draw both knees up towards the chin, again breathing out and fully contracting abdominal muscles. Lower the knees quickly and then breathe in, as in the second photograph, before starting again.

Repeat the whole exercise three to four times (i.e. nine to twelve knee-raisings).

Note.—The shoulders and arms should be relaxed throughout the movements. This exercise strengthens the abdominal muscles and also helps expiration from the bases of the lungs.

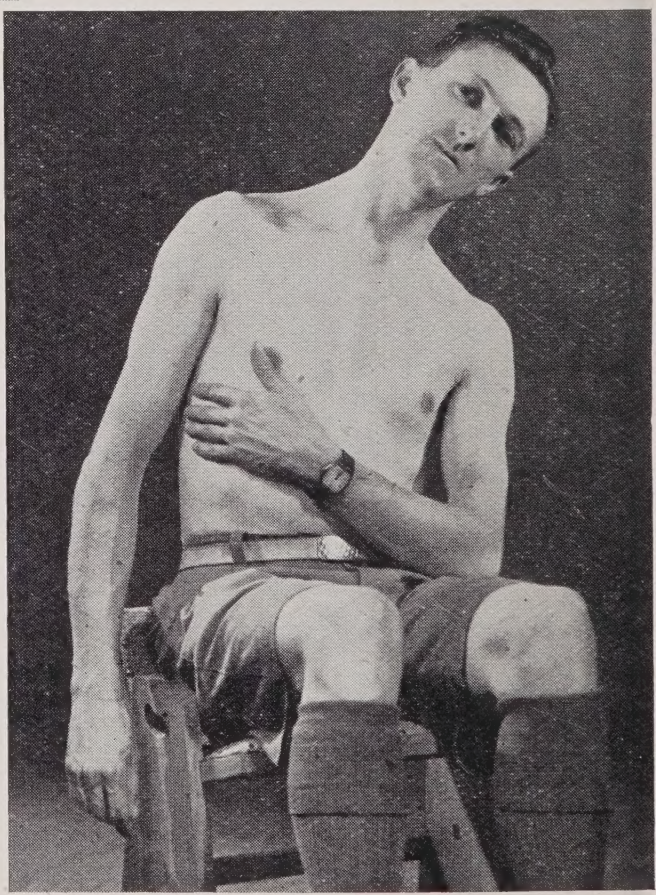
7. SIDE-BENDING

STARTING POSITION. Sitting with feet apart, right arm relaxed at side, left hand on right lower ribs—or the palm of the right hand can be used, well up on the ribs.



(i) Bend the head and shoulders to the right while breathing out and pressing the hand against the side.

(ii) Bend the head and shoulders slightly to the left while breathing in and swelling the right lower ribs as much as possible towards the right.

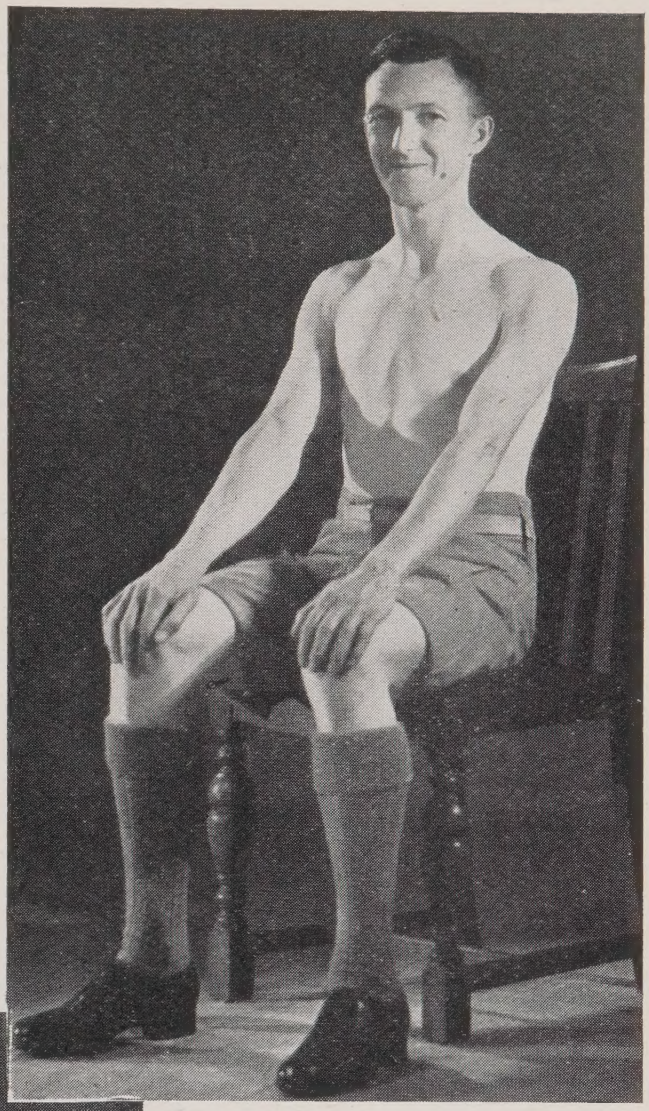


Note.—(i) is carried out more slowly than (ii). After six bends to the right, change hands and bend to the left side so that the base of the left lung is fully used. The bending must be high up and only above the waist. The hand presses firmly towards the end of the breathing out, and on breathing in the side of the chest is pressed out against the hand.

In addition to training full use of the bases of the lungs, this exercise loosens the lower ribs.

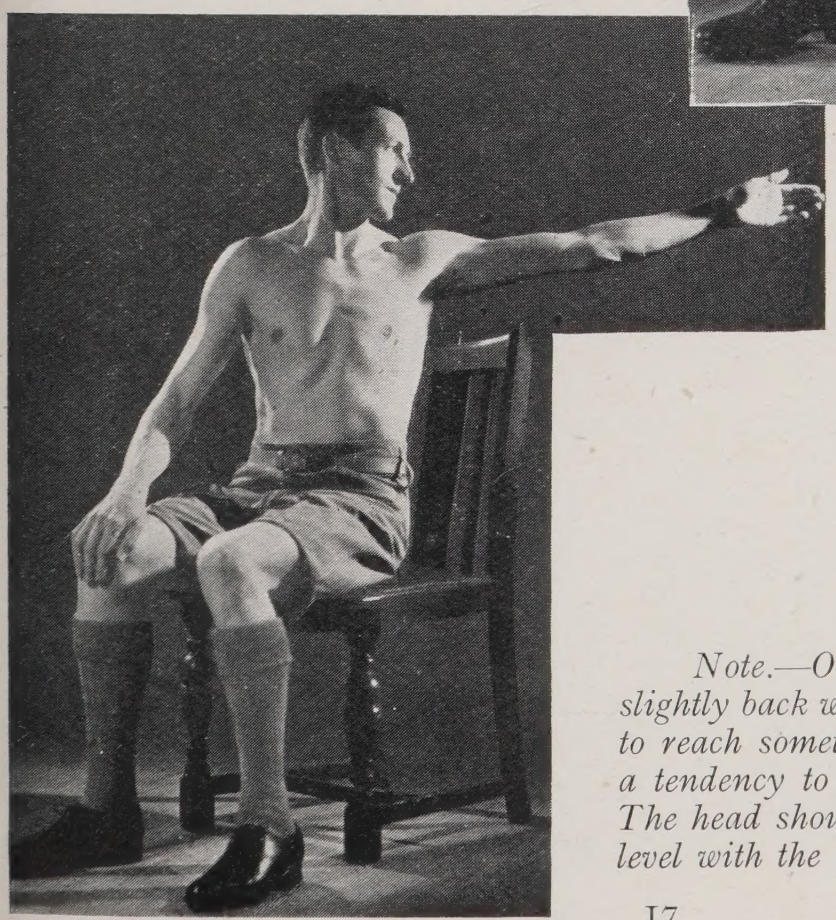
8. TRUNK TURNING

A TRUNK AND SHOULDER LOOSENING EXERCISE



STARTING POSITION. Sitting with feet apart, back straight and hands on knees.

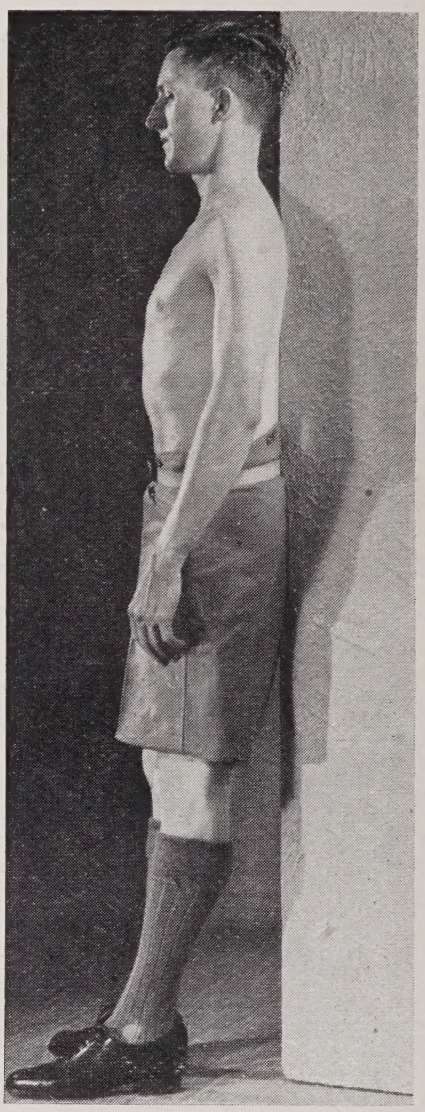
Turn the body and fling the left arm sharply to the left. Turn as far as possible, keeping back straight and using other arm as a lever to help push farther round. Relax the arm and turn forwards, allowing the hand to drop back on to the knee (as in the first photograph). Repeat four to six times to each side.



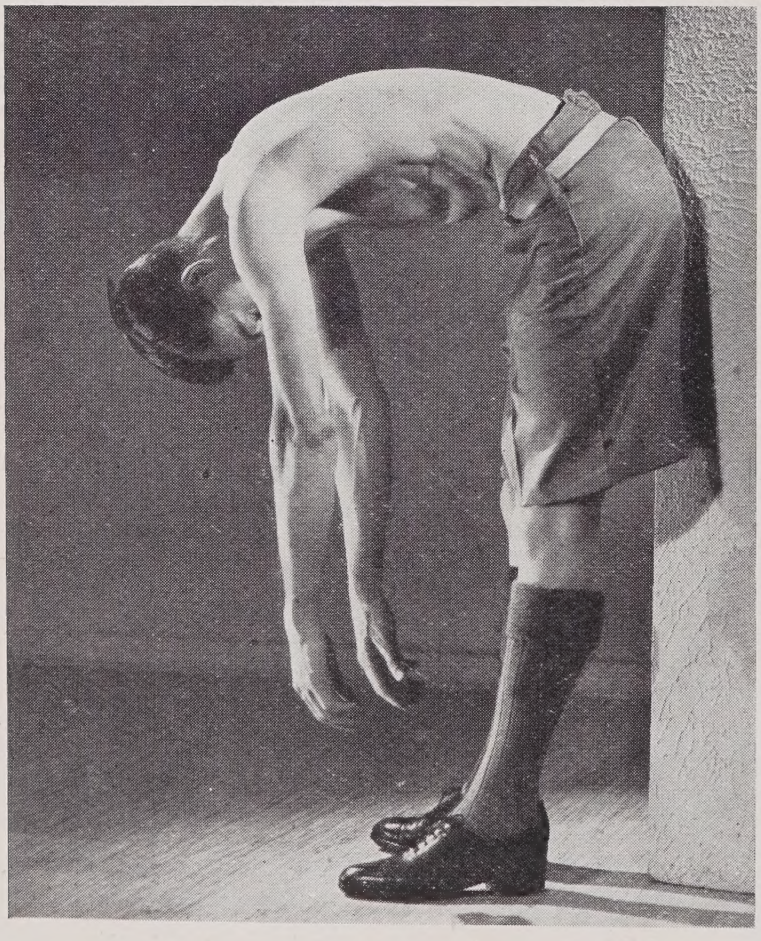
Note.—On turning, the body should lean slightly back with arm outstretched as if trying to reach something, otherwise there is always a tendency to lean forwards in this exercise. The head should turn so that the eyes are on a level with the outstretched thumb.

9. ADVANCED FORWARD-BENDING

A POSTURE CORRECTING AND BREATHING EXERCISE



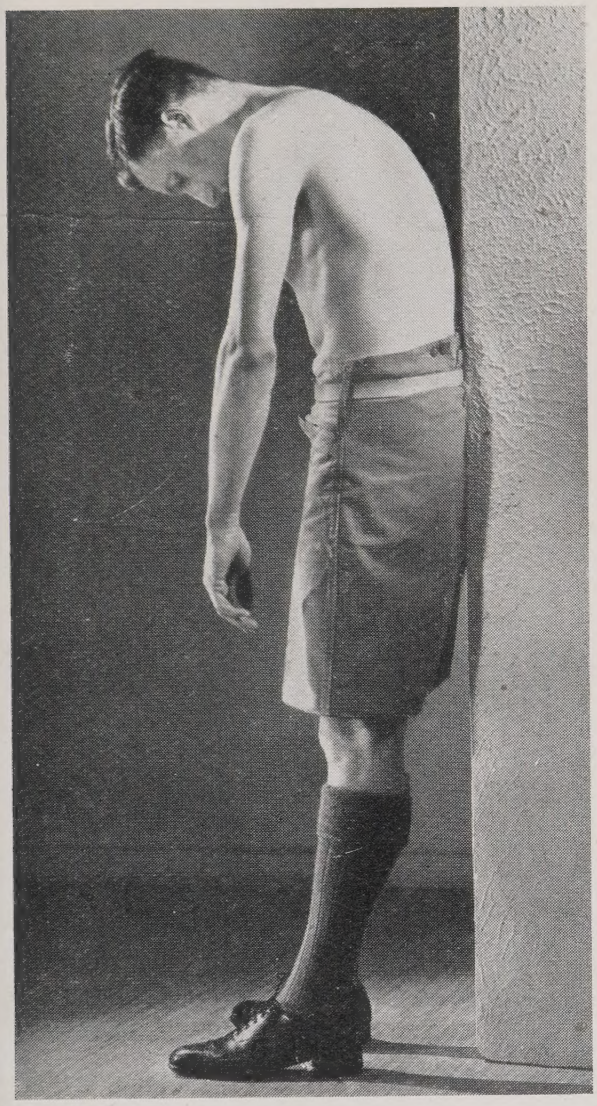
STARTING POSITION. Standing with the *whole* of back, shoulders and head against a corner of a wardrobe, doorpost, etc. The feet should be about six inches from the wall.



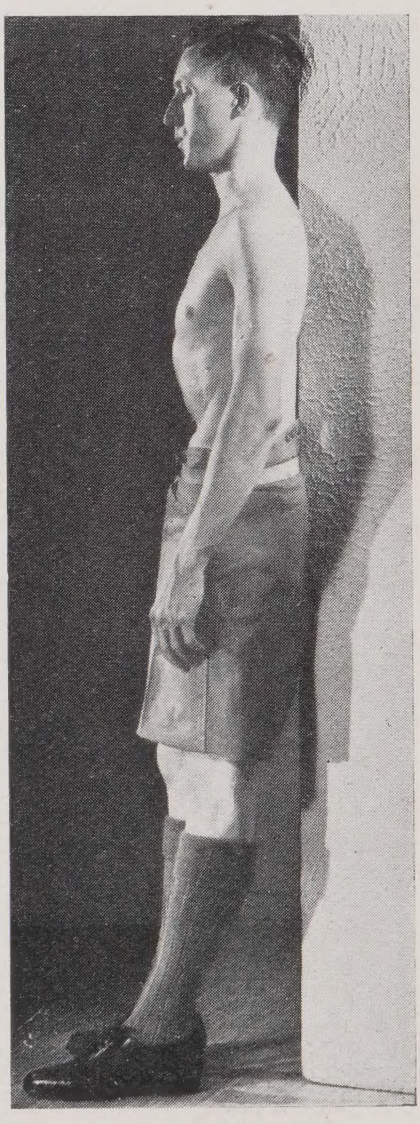
(i) Bend down slowly, dropping head, then shoulders, then back, while breathing out. The arms hang limply. At the end of bending forwards the abdominal muscles are drawn in as fully as possible.

9. ADVANCED FORWARD-BENDING

(continued)



(ii) While straightening back, at first keep abdominal muscles drawn in (this has the effect of pressing the lower part of the back against the doorpost), then gradually press the middle part, upper part and shoulders, neck and finally head against the doorpost (as in photograph 4). There is a pause in the breathing at first (during the rounding out of the lowest part of the spine), followed immediately by breathing in for the rest of the back-raising (as in the sitting exercise on page 11).

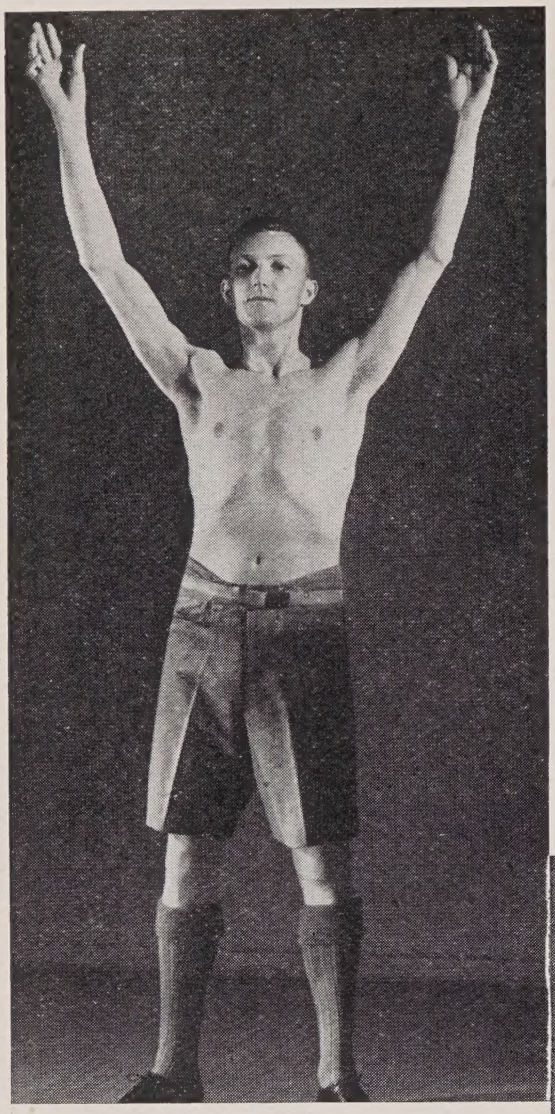


(iii) Holding the head and upper part of the back firmly against the edge, breathe out quickly contracting abdominal muscles so that the *lower part* of the back is flattened against the edge too.

Take in a small breath before restarting the exercise. See first photograph in which the patient is breathing in and note difference of abdomen in first and fourth photographs.

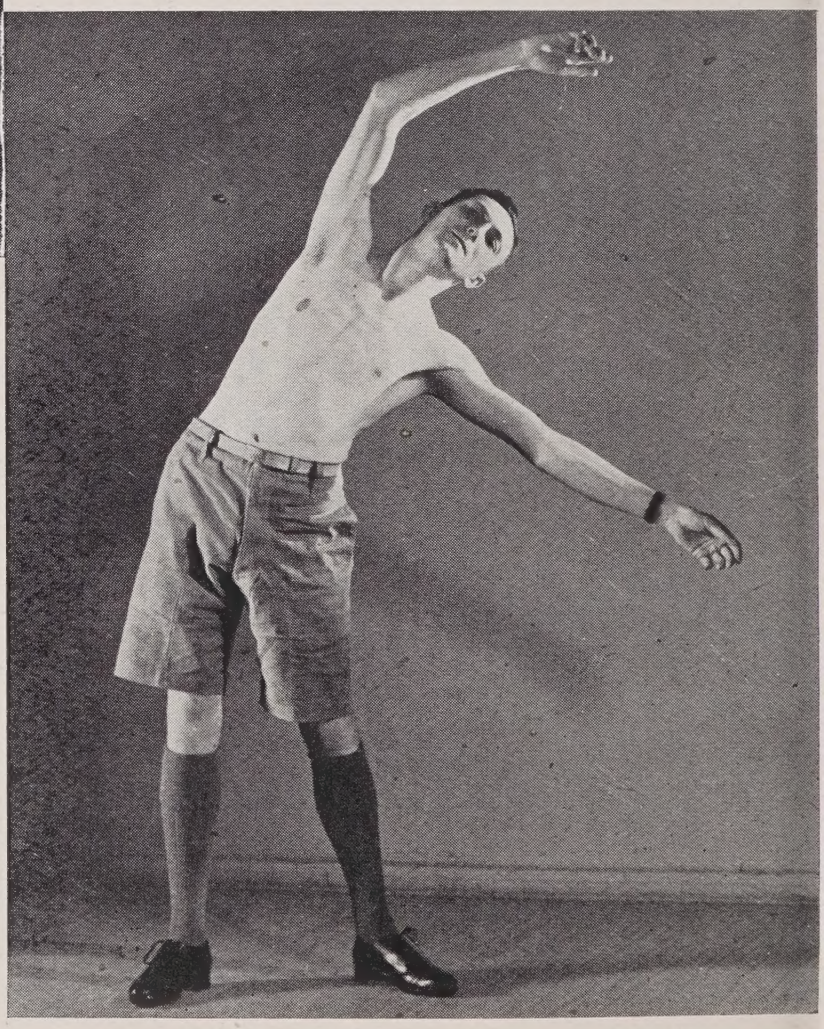
10. SIDE-BENDING WITH ROTATION

A COMBINED BREATHING AND LOOSENING EXERCISE

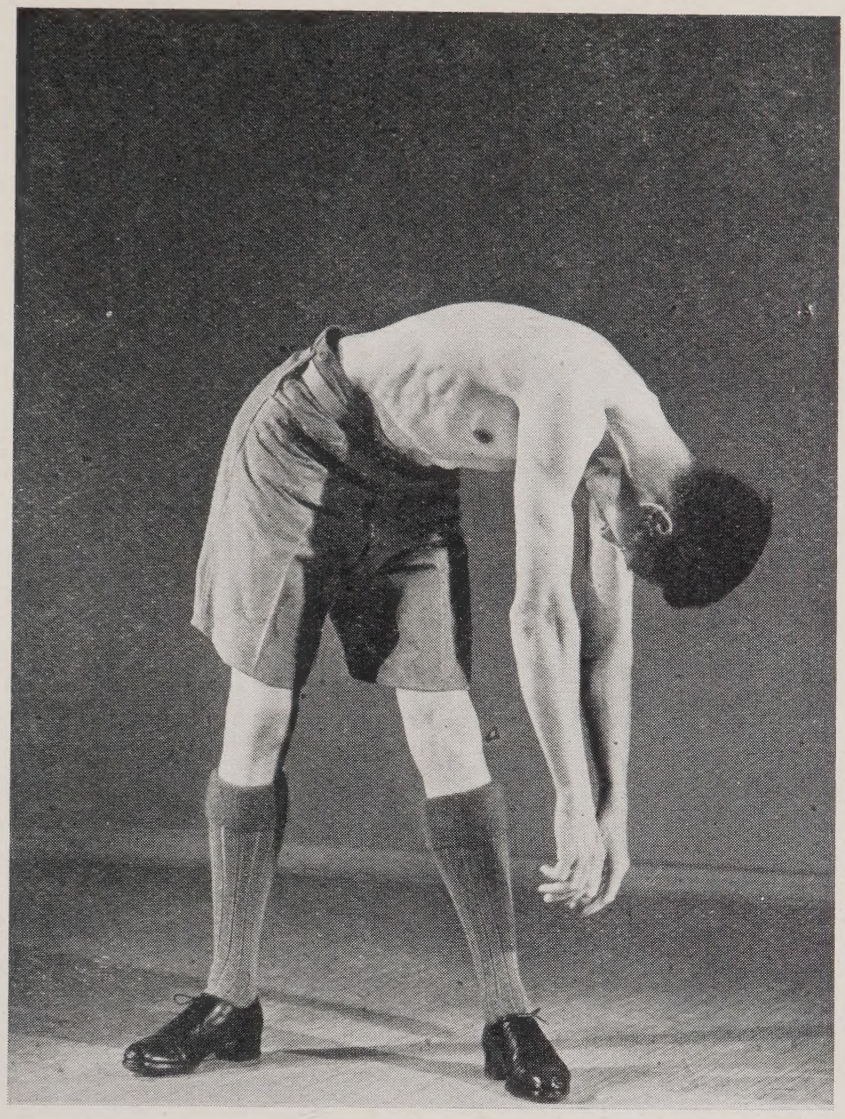


POSITION. Standing with feet apart.

(i) Carry the arms above the head while breathing in.



(ii) Bend slowly over to the left as far as possible while breathing out, allowing arms to bend loosely at elbows.



(iii) Twist while bending so that the arms are fully carried outside the left foot, while continuing to breathe out and fully contracting the abdominal muscles. Raise the body upright to position (i), (i.e. with back straight and arms widely apart above head) while breathing in.

Repeat the whole movement to the right. Continue three or four bends to each side. End the whole exercise by carrying the arms down from above the head and breathing out.

Note.—(i) Press the head back firmly during the first part of the exercise (side bending).

(ii) Aim to keep the back straight in first part of exercise (i.e. look forwards), do not lean back or turn, but bend over to the side as far as possible.

(iii) On side-bending the arms are not held stiffly, but allowed to fall easily.

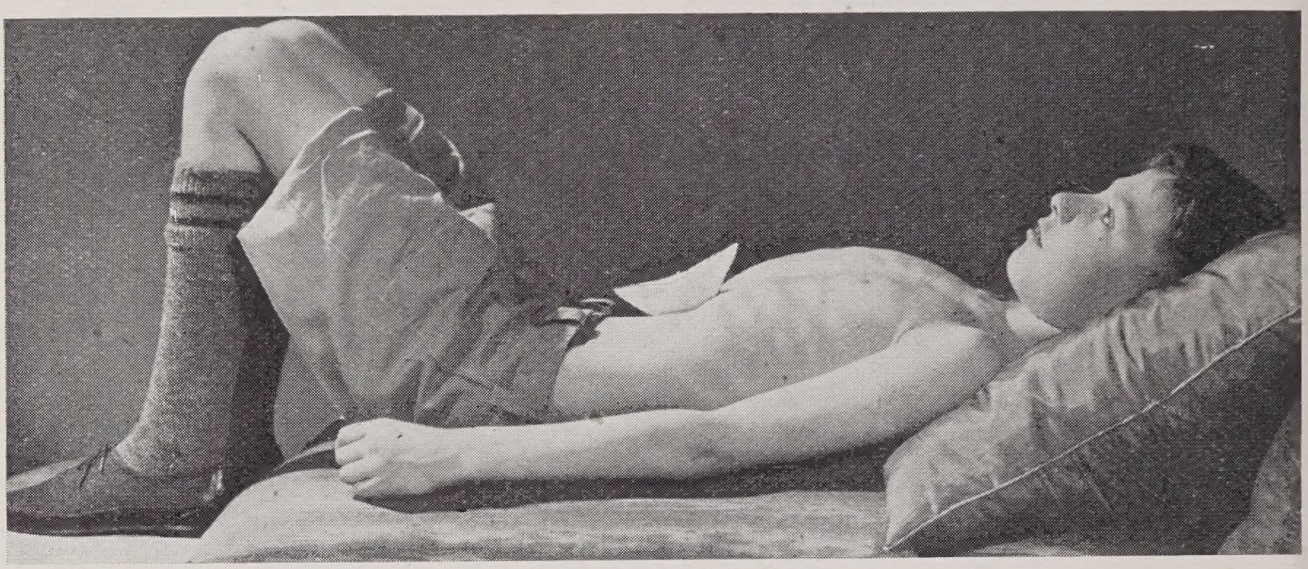
(iv) The full twist and bend should be carried out in the lower part of the back; neither hips nor arms should be twisted, nor feet moved.

Part III CHILDREN'S EXERCISES

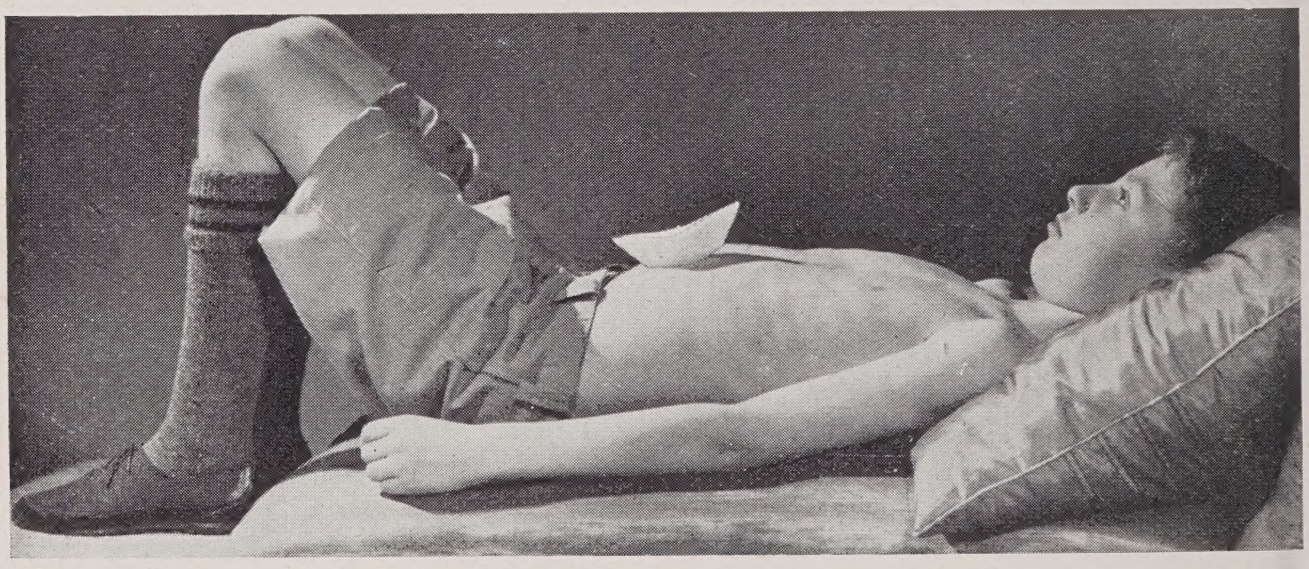
Some of the exercises used for grown ups are also useful for children, especially No. 3 (for children over six), Nos. 4, 5, 6 and 7. Nos. 4 and 6 should be included in the full scheme of five or six exercises to be practised regularly.

11. ABDOMINAL BREATHING FOR SMALL CHILDREN

STARTING POSITION. Lying with knees drawn up, arms loosely at sides and shoulders kept well down.



(i) Slowly breathe out, sinking chest and then abdomen, making small object (such as paper boat, celluloid fish, etc.) sink down between "waves".



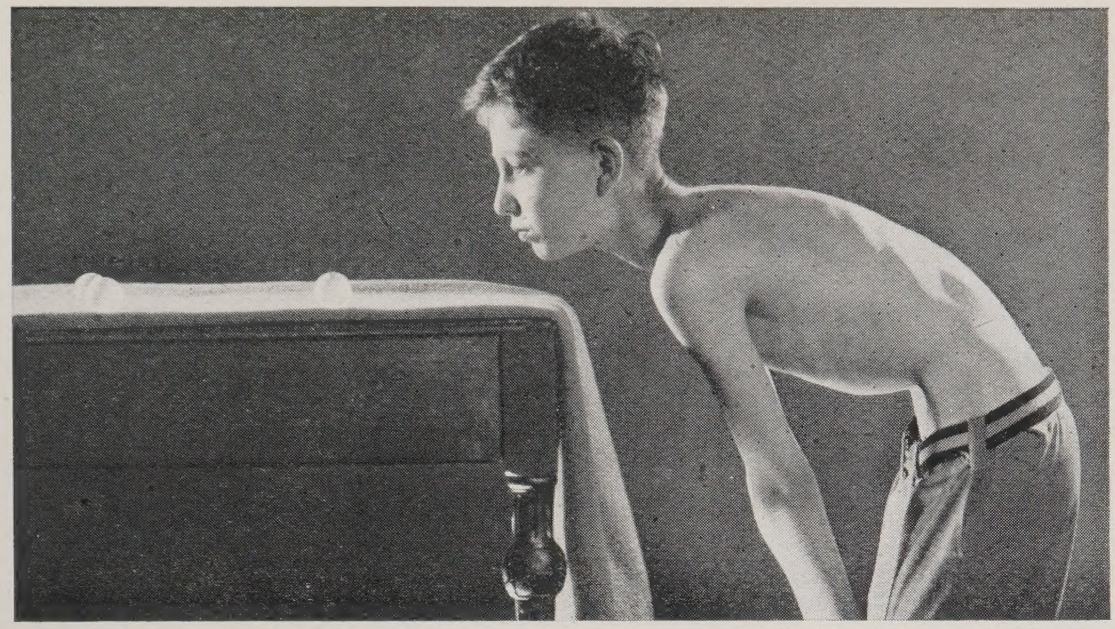
(ii) Relax abdominal muscles while taking in a small breath through the nose so that the toy comes up on the "crest of a wave". Do not raise the upper chest.

Note.—(i) Small children are very apt to overdo the swelling of the abdomen on breathing in; this must not be allowed.

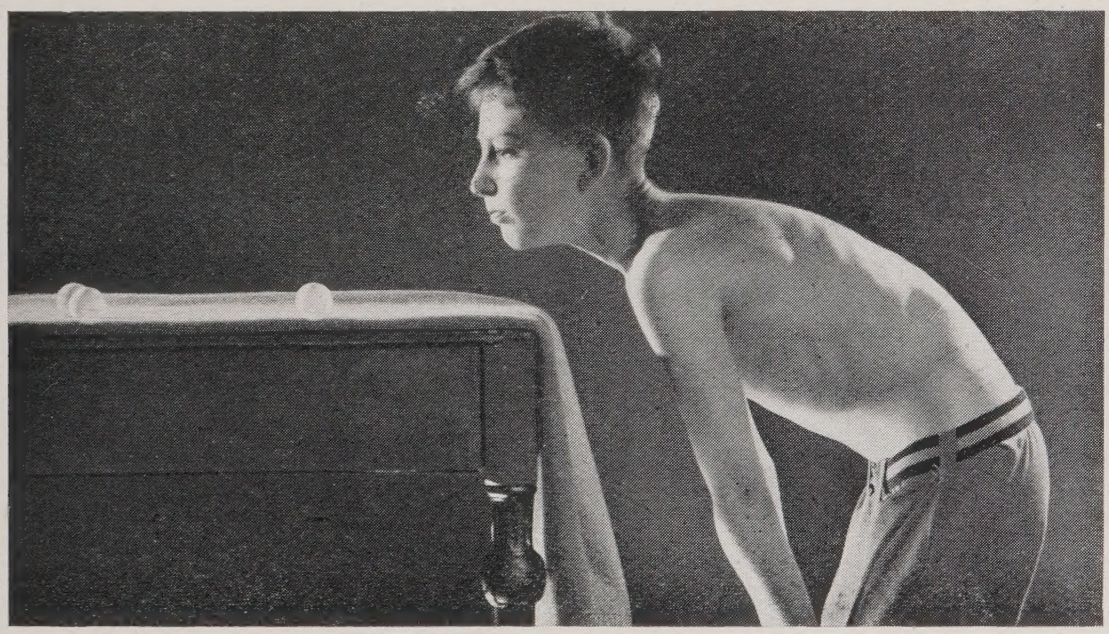
(ii) The breathing out must be continuous—no jerks or pauses on the way.

For children of six and under this exercise and exercise No. 13 are given, so that the small child has some object to blow. Older children learn abdominal breathing as in No. 1A for grown ups.

12. BLOWING EXERCISE



(i) Standing. Blow bits of paper, small balls (e.g. ping-pong balls) across a table. There must be one long blow, not many short ones. Aim at seeing how few breaths will make the balls reach the other end of the table. The table is covered with a blanket or some thick material to prevent the balls rolling too easily.



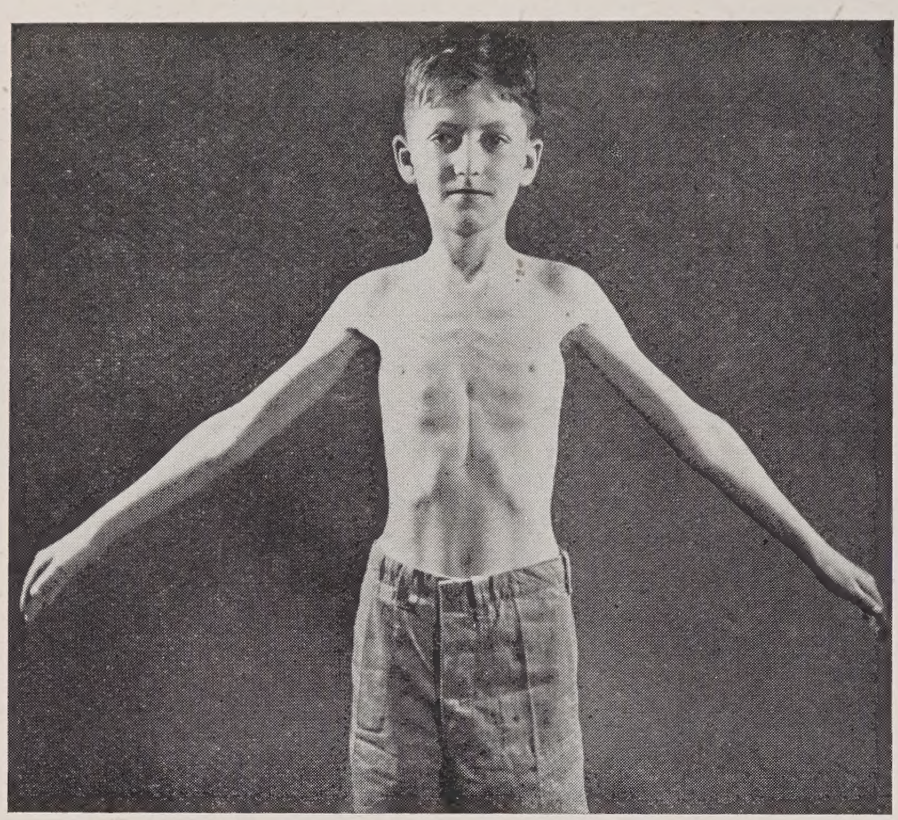
(ii) Pause and breathe in through the nose quietly with a breath only sufficiently large to relax abdomen and slightly expand lower front ribs. Do not move the chest.

Note.—The table should not be too low, otherwise the child's shoulders will be hunched up towards his ears. As in the photographs the neck should show fully and the shoulders not be moved in either breathing movement. Sometimes it is best to let a small child hold the table ; here again care is needed to see that he does not hunch up the shoulders—he need only hold very lightly and with arms well apart. It is all the better if the table is about on a level with the child's chin.

13. "WINDMILLS"

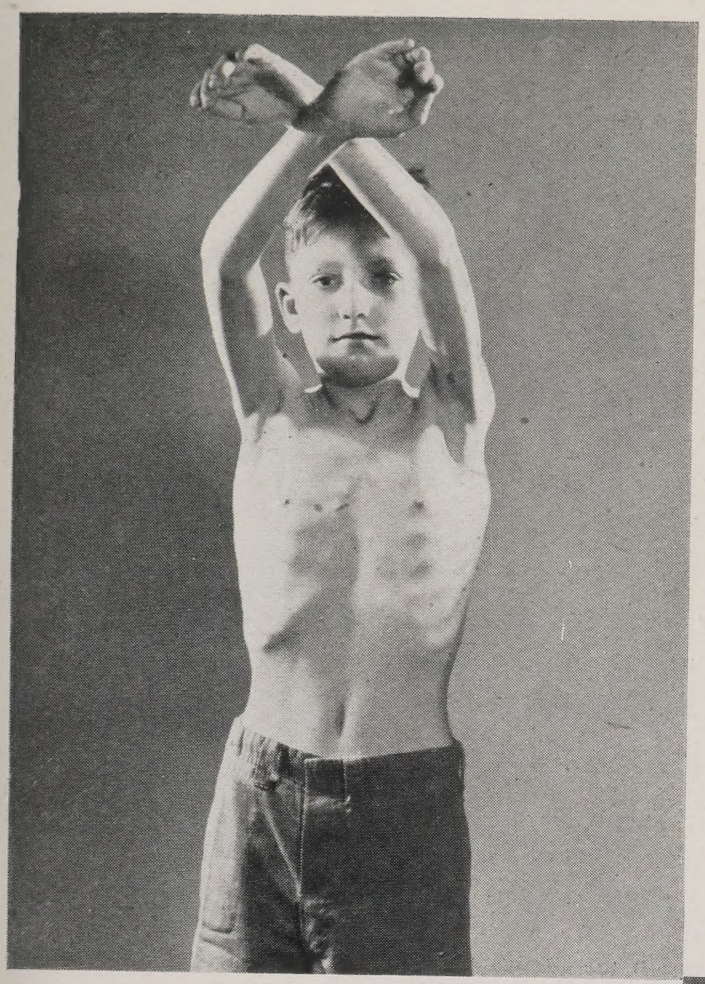
A SHOULDER LOOSENING EXERCISE

STARTING POSITION. Standing with feet apart.



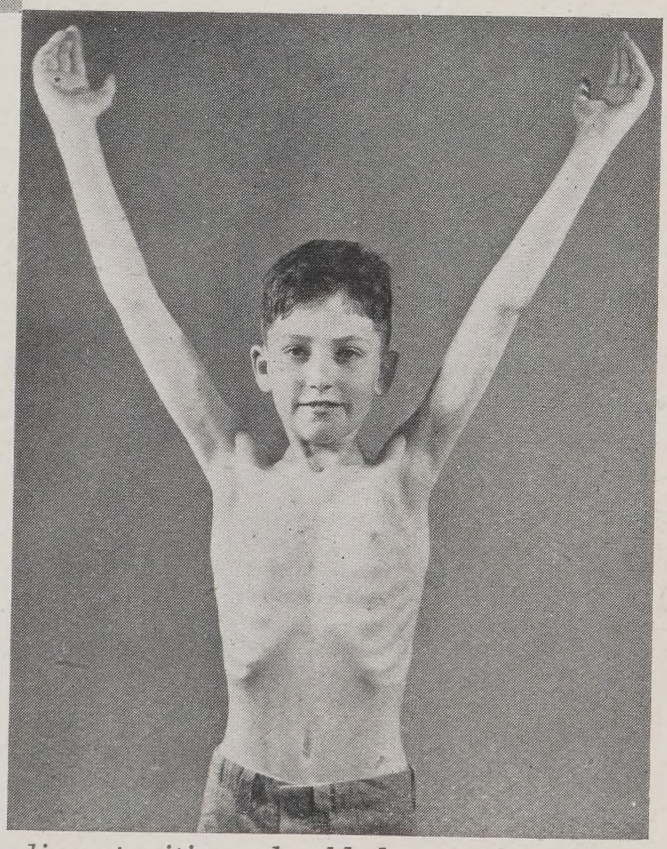
(1) The arms are carried in circles from position in first photo,

(ii) crossing them



(iii) and raising them upwards in front of the face.

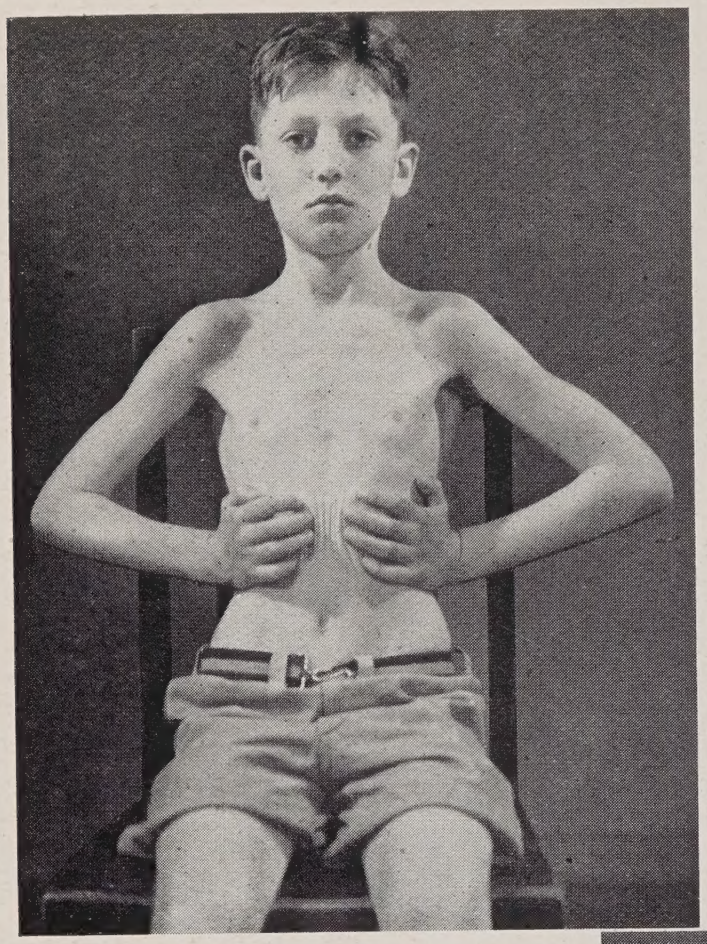
(iv) finally stretching them wide apart before completing the circles by lowering to position in the first photo again. The circles thus intersect each other.
This exercise is done quickly, ten to twelve circles, then drop the arms down and rest and repeat.



Note.—Throughout the exercise the standing position should be steady. The child should stand with weight thrown on to the ball of the foot (i.e. thrown forwards), knees well pressed back, abdomen drawn in, head held erect. The head needs to be kept straight especially during the arm upstretching part, when there is a tendency to poke the chin. The breathing should be natural with mouth shut.

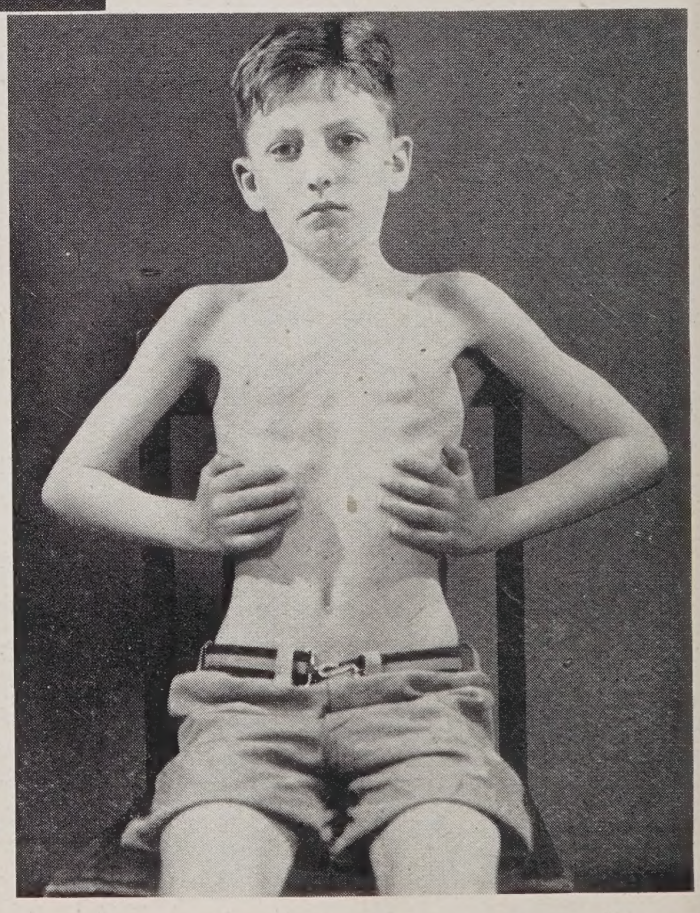
14. SIDE-EXPANSION EXERCISE WITH THE HANDS FOR PRESSURE

STARTING POSITION. Sitting with back resting, hands well up on lower ribs at the side, feet apart. The shoulders must be kept well down during the whole exercise.



(i) Breathe out through the mouth slowly, first sinking the chest as much as possible, and then the lower ribs, finally squeezing the ribs to help expel all the air possible from the bases of the lungs.

(ii) Breathe in, expanding the lower ribs outwards against a little pressure from the hands. Lighten the pressure at the height of breathing in.



Note.—This exercise at first is usually given lying with head and shoulders well up and knees bent, in which position grown-ups and children keep their shoulders more relaxed and gain maximum expansion of lower ribs with least movement of upper ones.

Pressure from the hands is not given until the last part of the breathing out, and is with the palm of the hand only. The fingers should be quite relaxed. Pressure is given for breathing in to provide something for the ribs to expand against. On starting to breathe out all pressure is relaxed (the hands merely resting against the sides) so that the shoulder and chest muscles can relax.

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